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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/756,407

Filing Date: January 14, 2004

Appellant(s): FUKUI, KOUTA

Sheldon J. Moss
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 29, 2007 appealing from the Office action mailed May 1, 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4332889	Siga et al	06-1982
20020123016	Hirabayashi	09-2002
1168066	EP	01-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 1-4, 6-7, 10-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of EP 1168066 (EP'066) in view of Siga et al (US Patent No. 4,332,889) and Hirabayashi (US 2002/0123016A1).

EP'066 discloses a photothermographic material as a whole wherein the material containing photosensitive silver halide, a non-photosensitive organic silver salt, a reducing agent, a binder and a silver-saving agent, and wherein the material exhibit an average contrast of 2.0 to 6.0. See the silver halide include any one of silver chloride, silver chlorobromide, silver iodochlorobromide, silver bromide, silver iodobromide and silver iodide on page 5, lines 24-25; the silver saving agent on page 8, formula [H], (G), (P); the reducing agent such as bisphenols reducing agent on page 13, [0077] and 1-1-bis(2-hydroxy-3,5,5-trimethylhexane on page 64, [0225]; Table 2-1 to 2-4 on pages 77-80 which exemplified two light sensitive layer, wherein the lower contains silver saving agent; and the image gradation on page 70, Table 1 having value from 2.9 to 3.5. Page 38, [0115] discloses that "it is preferred to use sensitizing dyes exhibiting

spectral sensitivity suitable for spectral characteristic of light sources of various laser imager or scanner”.

Siga et al disclose in column 6, lines 43-68 the relative amount of the silver iodide with respect to silver bromide to satisfy the sensitivity condition and storage condition. It is disclosed that “from the view point of sensitivity of image forming material, the silver halide is desired to contains, beside silver iodide, at least 2 mole %, based on silver halide component, silver bromide and/or silver chloride, although the silver halide may include only silver iodide, i.e. 100 mole % of silver iodide. Furthermore, from view point of stability of the raw image forming material, it is desired that silver halide component contains, besides silver iodide, silver bromide than silver chloride. Therefore, the most preferred silver halide component consists of silver iodide and silver bromide. In this case, silver iodide and silver bromide may be provided in either a mixture thereof or mixed crystals thereof. The molar ratio of silver iodide to silver bromide may be preferably 30/70 to 98/2, more preferably 50/50 to 95/5.” Hirabayashi discloses a photothermographic material having absorption maximum at 350 nm to 450 nm and different type of laser light source conventional used in the process of exposing the photothermographic material such as coherent light such as green laser of 500 nm to 600 nm and long wave laser such having emission in the near infrared region. Hirabayashi discovered that “after subjected to thermal processing, the sensitizing dyes remains on halftone dot images, producing problem that dot image quality or linearity is lowered, resulting to so called deterioration due to the remaining dye stain. It was found that the use of recently developed short wave laser having an emission at 350 nm to 450 nm to halftone dot images on the photothermographic material resulted in

superior images to those obtained by commonly known long wave laser, without causing stains.

See page 1, [0005].

EP'066 suggest the use of silver iodide and the use sensitizing dyes exhibiting spectral sensitivity suitable for spectral characteristic of light sources of various laser imager or scanner to spectrally sensitize the silver halide emulsion, but fails to exemplified the use of the silver iodide in the photothermographic material or a use laser light source having wavelength of 350 nm to 450 nm to exposed the photothermographic material or a photothermographic material that is capable of forming an image using laser light source having wavelength of 350 nm to 450 nm. The photothermographic material exemplified in EP'066 is exposed to laser source having wavelength in the infrared region and the silver halide emulsions are spectrally sensitized in the IR region to match the wavelength of the laser source. However, the selection of silver halide such as silver iodide or the type of laser light source would have been found *prima facie* obvious in view of Siga et al and Hirabayashi. Siga et al discloses the composition halide containing silver iodide and silver bromide within molar ratio of 30/70 to 98/2 in order to balance the sensitivity and storage stability of the photothermographic material. The silver halide having iodide content is less sensitive to light as a result it provides more stability to the photothermographic material. Hirabayashi teaches that the problem associates with photothermographic material containing infrared dye and the improvement of photothermographic material that is sensitive to wavelength of 350 nm to 450 nm in term of superior halftone dot image.

It would have been obvious to the worker of ordinary skill in the art at the time the invention was made to use the silver iodide taught in EP'066 or silver halide having composition taught in

Siga et al in combination with the use of silver halide emulsion sensitive to laser light having wavelength of 350 nm to 450 nm to provide a photothermographic material with superior halftone dot image, and thereby provide a material as claimed.

(10) Response to Argument

The Appellants' argument provided in the Appeal Brief is not persuasive for the reason set forth in the rejection above. The material of EP'066 exhibit an average contrast of 2.0 to 6.0 which overlaps the image gradation of 2.0 to 4.0 presented in the argument. EP'066 suggests among the silver halide grains silver bromide and silver iodide, and the use of sensitizing dyes exhibiting spectral sensitivity suitable to spectral characteristic of light sources of various laser imager or scanner. The upper limit of the silver iodide content in the silver halide of 40 to 100 mole % is within the range of the use of the silver iodide suggested in EP'066. Furthermore, it has been known in Siga et al to use the a mixture of silver bromide and silver iodine with molar ratio of silver iodide to silver bromide may be preferably 30/70 to 98/2, more preferably 50/50 to 95/5 in order to balance the sensitivity and storage stability of the photothermographic material. Therefore, the worker of ordinary skill in the art at the time the invention was made to use silver iodide suggested in EP'066 or a mixture of silver iodide and silver bromide known in Siga et al to balance the sensitivity and storage stability of the photothermographic material. The worker of ordinary skill in the art would have sensitize the photothermographic material suitable to the spectral characteristic of laser source having wavelength of 350 nm to 450 nm since it has been known in Harabayshi to provide a photothermographic material a sensitivity to wavelength of 350 nm to 450 nm in term of superior of halftone dot image.

The Appellants appear to argue the applied prior art separately while the rejection is based on the combination of the applied prior art. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The material of EP'066 is a black and white photothermographic material including that used in the medial diagnosis. See page 2, [0005]. EP'066 discloses the use of silver bromide and silver iodide. The material taught EP'066, Siga et al and Hirabayashi et al are the same type of black and white photothermographic material. These materials are used in the formation of silver image by exposing the material light exposure to form a latent image in the light sensitive silver halide, and heating the material to form an image.

The Appellants argue that the material taught Siga et al is different from that taught in EP'066 and Harabayashi et al. It is argue that Siga discloses a post-activation type photothermographic material, which is a non-photosensitive under normal lighting conditions and must be heated in order to become photosensitive (activated). In contrast, the photothermographic material of the present claimed invention, along with EP'066 and Hirabayashi, is a conventional type, which require no-preheating. The applicant point out Siga, column, lines 20-30 to illustrate the differences the post-activation material and the conventional photothermographic material. and the heat-developable material.

The Appellants appear to mischaracterize the teaching of Siga in column 2, lines 20-30. Column 2, lines 20-30 describes the difference between the field of wet process silver halide photographic material and the field of the dry process photographic or image-image forming material comprising as essential component an organic silver salt oxidizing agent, a reducing

agent for silver ions and the silver halide catalyst. All the material taught in EP'066, Hirabayashi et al and Siga is similar system containing an organic silver salt oxidizing agent, a reducing agent for silver ions and the silver halide catalyst. Siga discloses that the wet process photographic material and the dry process photographic material are different in components and mechanism of image formation. Siga does not disclose different type of dry process photographic material having different in component and mechanism of image formation. All dry process photographic material undergoes same mechanism in the process of forming an image.

The Appellants rely on the Declaration under 37 CFR 1.132 to obviate the *prima facie* case of obviousness rejection. The Appellants argue that the photothermographic 3a to 3d and 114a to 114d of the present invention increase the image density (Dmax) to levels higher than those attained by the corresponding comparable 1 and 113, respectively, and also prevent the deterioration of print-outs. This is unexpected even if Yanagisawa (EP'066), Siga and Hirabayashi are combined. It is further argued that in contrast, the comparative photothermographic materials 116a to 116d each having silver iodide content of less than 40 mol % can increase the image density (Dmax) to levels higher than those attained by the comparative material 115, but cause significant deterioration of print-outs. Similarly, the comparative photothermographic materials 118a to 118d each having a silver iodide content of less than 40 % can increase the image density (Dmax) to level higher than those attained by the comparative photothermographic material 117, but cause significant deterioration of print-outs.

It is the Examiner's position that the Declaration fails to obviate the *prima facie* case of obviousness rejection set forth above as of the following reason:

First, the results shown in the Declaration would have been expected by the worker of ordinary skill in the art. The Declaration states that the samples 3a to 3d were prepared according to sample in Table of the experiment of 1 of the CFR 1.132 declaration dated July 14, 2005. The sample 1 contains 2.2 g/m² of total silver amount and 100 mole % silver iodide content, and contains no silver saving agent. The sample has same value of print-outs as the samples 3a to 3d. The value of Dmax and Gradation of the samples 3a to 3d would have been expected to be higher than that of the sample 1 due to the use of silver saving agent. See for instance EP'066 in [0043] which discloses that "the silver-saving agent used in the present invention refers to the compound capable of reducing silver amount necessary to obtain a prescribed silver density". Therefore, the increase the density Dmax and Gradation of the samples 3a to 3d would have expected that the adding of the silver saving agent to the comparative sample 1. The different in color tone between the samples 1 and 3a to 3d would have expected because the use of silver saving agent found to be improved in both in color tone and image storability of photothermographic material in view of the teaching of EP'066. See page 83, Table 3, [0284]. Likewise, the samples 113 and 114a-11d would have expected for the same reason set forth in the samples 1 and 3a-3d. The samples 113 contains 2.2 g/m² of total silver amount and 40 mole % silver iodide content, and contains no silver saving agent. This sample has similar value of film physical property, Dmin and print-outs same as the inventive samples 114a to 114d. The value of Dmax, Gradation, color tone and image stability of the samples 114a to 114d would have been expected to be higher than that of the sample 113 due to the use of silver saving agent. The use of silver saving agent taught in EP'066 is to increase the image density while reducing the total silver amount.

The samples 116a-116d and 118a to 118d wherein the samples contains silver iodide of 35 mole % and 10 mole % respectively, shows similar results with respect to the Dmax, Gradation, silver tone, brightness with respect to the samples 3a-3d and 114a to 114d which contains silver halide having silver iodide content 100 mole % and 40 mole % respectively. Therefore, no improvement in term of the Dmax, Gradation, silver tone and physical property with respect to the silver iodide content in the silver halide emulsion. There is a difference in value of ΔD_{min} and image storability between the samples 3a-3d, 114a-114d and samples 116a-116d and 118a to 118d. The Appellants may argue that the ΔD_{min} and image storability (print-out) found to be increased when the silver iodide content in the silver halide is 35 mole % and 10 mole %.

It is the Examiner's position that these differences in values would have been expected from the teaching of Siga et al. It is taught in Siga in column 5, lines 11-20, that silver iodide is superior in thermal stability to silver bromide and silver chloride, and in column 6, lines 43-48 to select a silver halide composition containing silver iodide and silver bromide in a molar ration from 50/50 to 95/5 in order to balance the sensitivity and storage stability of the photothermographic material. The worker of ordinary skill in the art would have used the silver iodide taught in EP'066 to achieve the balancing of the sensitivity and stability of the raw image forming material due to the knowledge of the property of the silver iodide taught in Siga et al. The silver iodide stabilizes the photothermographic material before processing, and it would have expected that the material containing silver iodide stabilize the photothermographic material after processing. There is no evidence showing that the material having raw storage stability before imaging does not have image stability. It is shown in the Declaration signed on March 26, 2007, Table 4, that the samples 115 to 118d shows that the samples 1 contain silver

iodide content of 35 mole % and 10 mole % do not good unprocessed stock storability. These samples inherently do not have good image storability. The inventive samples 3a to 3d and 114a to 114d and the comparative samples 1 and 113 containing the silver iodide of 100 mole % and 40 mole % in the silver halide have good unprocessed stock storability. These samples have good image storability (print-out). Therefore, the worker of ordinary skill in the art would have expected the improvement of the results in print-out is expected by the use of silver halide having high iodide content such as taught in Siga.

Second, the showing in the Declaration is insufficient to determine the unexpected results of the present claimed invention. The comparative sample 1 and 3a to 3d contains silver halide emulsion A which is in turn contains a mixture of silver emulsions 1, 2, and 3. The silver halide emulsion 1 contains pure silver halide grains having a mean sphere equivalent diameter of 0.004 micron, and a variation coefficient of sphere equivalent diameter 18 %. The silver halide emulsion 2 contains pure silver iodide tabular grains having a mean circular equivalent diameter of projection area of 0.164 micron, a grain thickness of 0.0032, an aspect ratio of 5, the mean sphere equivalent diameter of 0.11 micron, and a variation coefficient of sphere equivalent of 23 %. The silver halide emulsion 3 is pure silver iodide having a mean sphere equivalent of 0.22 micron, and a variation coefficient of sphere equivalent diameter of 17 %. The comparative sample 113 and the inventive samples 114a to 114d contains silver halide emulsion J from the Declaration signed on June 6, 2005 which states that the sample 113 contains silver halide emulsion J having silver halide composition 40 and the rest the composition is silver bromide. The comparative sample 117 and the inventive samples 118a to 118d contains silver halide emulsion L from the Declaration signed on June 6, 2005 which states that the sample 117

contains silver halide emulsion L having silver halide composition 10 and the rest the composition is silver bromide. The crystal type, composition of halide and the size of the silver halide containing in the samples 1 and 3a-3d are provided such as shown above. However, the Declaration does not provide of the composition, the type of crystal or the size of silver halide emulsion in the emulsion J and the silver halide L. Therefore, it is improper the results of the comparative samples 115-118d with the samples 3a-3d and 114a-114d due to the unknown type, size and composition of the silver halide containing in silver halide emulsion J and L. The EP'066 on page 3, [0027] discloses that "in order to minimize cloudiness after image formation and to obtain excellent image quality, the less average size, the more preferred, and the average grain size is preferably not more than 0.2 micron. Furthermore, silver halide grains are preferably monodisperse grains". Therefore, the size of size of the silver halide having an impact on the photothermographic material in term of minimizing cloudiness after image formation and obtaining excellent image quality.

Third, the Declaration is not commensurate with the scope of the claimed invention. The silver saving agent of formulas H-94, H-64, H-37 and H-21 in Table A is a hydrazine compound presented in Table 1 on page 70 of EP'066. The compounds of formula H-94, H-64, H-37 and H-21 are the more preferred compounds of the EP'066. However, the scope of the "silver saving agent" presented in claim 1 encompasses any known silver saving agent disclosed in EP'066 such as the compound of formula (G), and (P). Moreover, the samples used in the Declaration is related to mixture of silver iodide grains having different size and different type of crystal while the scope of claim encompass silver halide having silver iodide content from 40 mole % to 100 mole % of any size and ant type of crystal.

Fourth, the Appellants fails to compare the claimed invention to the closest prior art of record, namely EP'066, Example 3 on pages 71-83, especially, the samples on Table 3 on page 83, wherein the photothermographic material has gamma value within the scope of the gradation 2 to 4 claimed in the present claimed invention. See for instance, page 83, [0285], [0286], samples 205-211, 213-218, 220-230 which exhibited minimized fogging, sufficiently enhanced sensitivity, and improves silver tone and superior gradation, and also indicating superiority as a photographic material for medial use and photothermographic material superior in storage stability. Also, the material shown in Table 1 on page 70 of EP'066, samples 101A to 106B, 108 which has gradation value within the scope 2 to 4 claimed in the present claimed invention. It is shown in Table 1 of EP'066 that samples 101A to 106B, 108 contains lower silver coverage, exhibited superior photothermographic performance such as image tone and gradation; and unexposed and processed samples also exhibiting superior storability. The image tone is relatively stable when allowed to stand for 7 days at 25 °C and 55 % RH under the fluorescent lamp. The image tone shown in EP'006 has no problem in image for practical used when ageing.

Fifth, in the Declaration on page 5, the Declarant states that "while Siga discloses the use of silver iodobromide containing high silver iodide, Siga merely teaches high sensitivity and improved raw storability. Siga does not mention the improvement in image stability (improvement in print-out performance). The improvement of raw material storability, which is disclosed in Siga, relates to suppressing Dmin (fogging) while unexposed/undeveloped image-forming material is stored in the dark place. On the other hand, the improvement in image stability (print-out performance) related to the phenomena in the photosensitive silver halide remaining in the image forming layer even after exposure and thermal development turns into

silver (blackened) while the photothermographic material is stored in a bright place after thermal development, deteriorating image stability as a results of fogging.

The argument is not persuasive. Siga may not mention about the image stability, but EP'066 achieves the image stability by using lower amount of silver in combination with the use of silver saving agent. EP'006 uses silver saving agent to reduce silver coverage, which means reducing the amount of silver source and the amount of silver halide that is used as photocatalyst for silver source. The Appellants are referred to EP'066, page 69, [0248] and page 70, Table 1, under Image Tone Aged wherein the samples are exposed and processed and allowed to stand for 7 days at 25 °C and 55 % RH under a fluorescent lamp. The image show substantially no problem in image in practical use. Therefore, the improvement of the image print-out would have expected from the use of silver saving agent taught in EP'066. Moreover, it has been known in Siga that silver iodide is superior in thermal stability (col. 5, lines 11-12), and it would have expected that the silver iodide would be more stable than the silver bromide or chloride when used in the print-out conditions of 30 °C and 70 % RH under fluorescent lamp set forth in the "Evaluation of image storability" as evaluation test presented in the specification disclosure.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,



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